Brandon Leung

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Education

University of California, San Diego (UCSD) **Sep. 2015 – Dec. 2021 (Expected)**

- **Current M.S. student in Machine Learning & Data Science**, expected graduation December 2021. GPA 3.86.
- **B.Sc. in Computer Science**, graduated August 2019. GPA 3.88 (Magna Cum Laude, with highest distinction).

Significant Projects

Drone Flight Dataset for Neural Network Vulnerability Assessment **(Jun. 2017 – Present)**

- Project leader & main developer of a novel drone flight system, recruiting 13 to collect a 120,000 image dataset.
- Published to CVPR; conducted experiments show severe vulnerabilities (30% drop) in neural networks like ResNet to pose & camera shake. Extensively used Python, PyTorch, OpenCV, and ROS in an Ubuntu environment.

Improving 3D Reconstructions with Self-Supervised Machine Learning **(Aug. 2020 – Present)**

- Developed a novel neural network refinement algorithm to generate 3D meshes from a single image.
- Used self-supervised learning & symmetry regularization; beats state-of-the-art (up to 47%), across many datasets.

Self-Driving Cars using 2D/3D Action and Explanation Prediction **(Feb. 2021 – Present)**

- Guided formulation & development of a model fusing 2D images & 3D pointclouds for self-driving car navigation.
- 2D & 3D explanations from Faster R-CNN & MVX-Net are jointly predicted with actions, justifying model decisions.
- Annotated new action & explanation annotations labels from Amazon Turk to add to the Waymo Open dataset.

Statistical Linguistic Analysis for User Chat Message Logs **(Feb. 2021 – Jul. 2021)**

- Built an interactive dashboard to analyze user chat logs and describe their linguistic behavior.
- Applied NLP transformer models (RoBERTa, GPT-2) to sentiment analysis, clustering, style transfer, & generation.
- Developed with Voilà. Tested with pytest and documented with Sphinx. Deployed using AWS (EC2 and S3).

Publications

- **Catastrophic Child's Play: Easy to Perform, Hard to Defend Adversarial Attacks** **Published, CVPR 19**
  Brandon Leung, Chih-Hui Ho, Erik Sandstrom, Yen Chang, and Nuno Vasconcelos
- **Black-Box Test-Time Shape REFINEment for Single View 3D Reconstruction** **In progress, MS Thesis**
  Brandon Leung
- **Explainable 3D Object-Induced Action Decisions for Autonomous Vehicles** **In progress, CVPR 22**
  Arth Dharaskar, Allen Cheung, Brandon Leung, Chih-Hui Ho, and Nuno Vasconcelos

Professional Experience

Graduate Student Researcher **Statistical Visual Computing Lab, UCSD** **Jun. 2017 - Now**

- Researching deep learning based computer vision under Prof. Nuno Vasconcelos, with a focus in 2D/3D detection, domain adaptation, GANs, 3D reconstruction, self-supervised learning, and explainable neural networks.

Software Engineer, Intern **Himax Imaging** **Summers 2015 & 2016**

- Developed internal quality control programs in Java for a R&D/fabrication company specializing in CMOS image sensors used in smartphone cameras and car backup cameras.

Awards and Additional Experience

- **NSF Graduate Research Fellowship** (GRFP), Mar. 2020.
- **Sloan Foundation Graduate Fellowship**, Sep. 2019.
- **UCSD Undergraduate Research Award**, May 2019, awarded to 2 graduating UCSD ECE students each year.
- **NSF REU Research Grant**, Sep. 2018.
- **Teaching Assistant, Data Science Theory (DSC 40A/B) and Programming (CSE 8A) at UCSD**, Jan. 2018 – Jan. 2019.
- **UCSD Research Program Mentor**, 2018 – 2021, mentored students for UCSD's SRIP, GEAR, and ENLACE programs.
- **Conference Reviewer at ECCV 2020, ICCV 2021, CVPR 2021**.
- **IT Technician, UCSD**, 2016 – 2017, gave networking, software, and hardware support for UCSD's students & staff.

Technical Skills

- **Expertise in:** Python, PyTorch, Jupyter Notebooks, OpenCV, Numpy, Plotly, Bash, Docker, pytest, Sphinx.
- **Experience with:** Java, C, HTML/CSS, JavaScript, AWS, Matlab.